US009822521B1

(12) **United States Patent**
Kuo et al.

(10) **Patent No.: US 9,822,521 B1**
(45) **Date of Patent: Nov. 21, 2017**

(54) **ASSEMBLY OUTDOOR BALCONY**

(71) Applicants: **Chingyao Kuo**, Luzhou (TW); **Norman William Liefke**, Surrey (CA)

(72) Inventors: **Chingyao Kuo**, Luzhou (TW); **Norman William Liefke**, Surrey (CA)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 0 days.

(21) Appl. No.: **15/200,106**

(22) Filed: **Jul. 1, 2016**

(51) **Int. Cl.**

E04B 1/00	(2006.01)
E04B 1/41	(2006.01)
E04B 5/10	(2006.01)
E04B 1/38	(2006.01)

(52) **U.S. Cl.**
CPC ***E04B 1/003*** (2013.01); ***E04B 1/40*** (2013.01); ***E04B 5/10*** (2013.01); *E04B 2001/405* (2013.01); *E04B 2103/06* (2013.01)

(58) **Field of Classification Search**
CPC ... E04B 1/003; E04B 1/40; E04B 5/10; E04B 2001/405; E04B 2103/06
USPC 52/282.4
See application file for complete search history.

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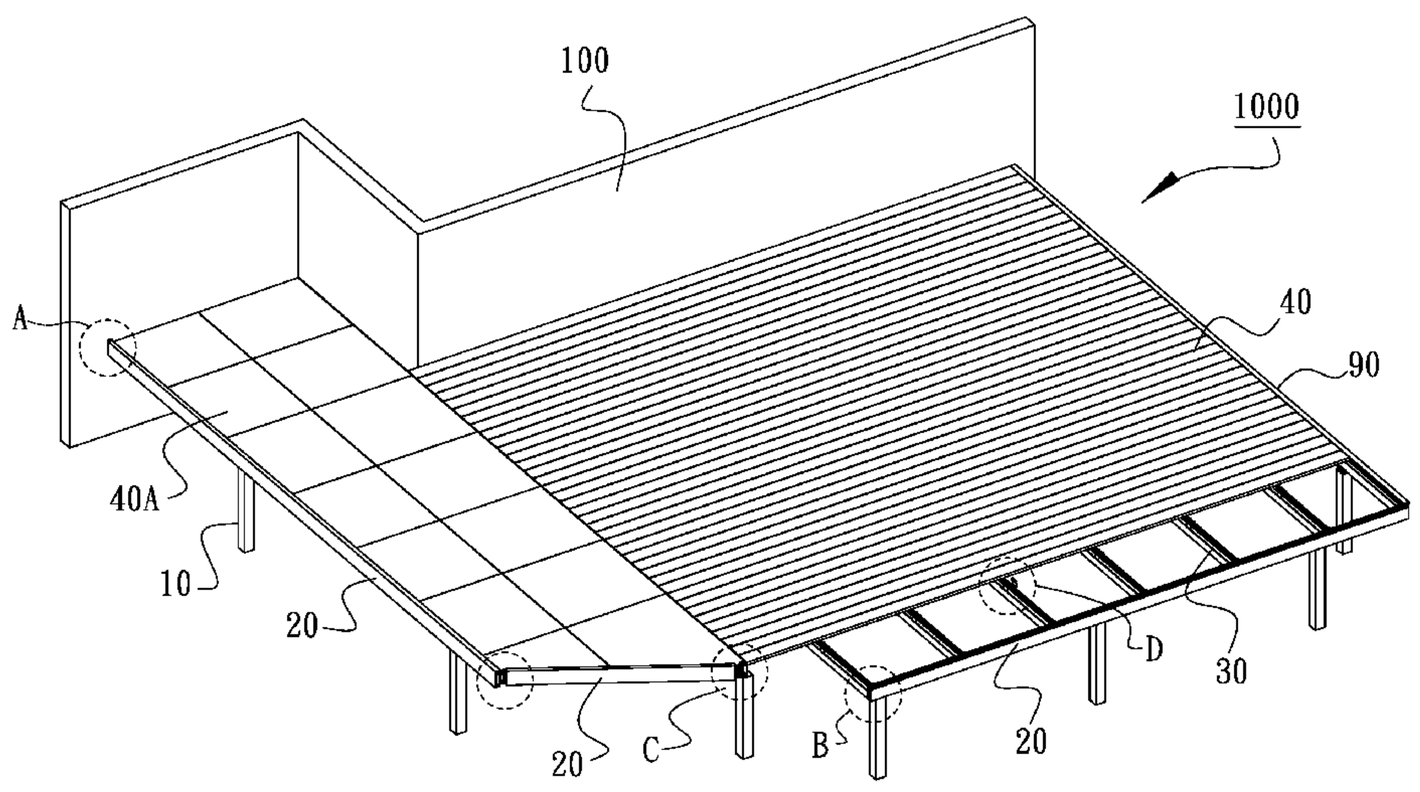
Primary Examiner — Charles A Fox
Assistant Examiner — James Buckle, Jr.
(74) *Attorney, Agent, or Firm* — Bacon & Thomas, PLLC

(57) **ABSTRACT**

An assembly outdoor balcony are made up of a plurality of columns, cross beams, beams, adjustable hanging elements, wall-assembled hanging elements and balcony panels, wherein the columns are disposed at interval to form the whole periphery of the balcony; the cross beams can be quickly assembled onto the columns through a beam hanger; the adjustable hanging element allows the joint angle between two beams to be different depending on the environment and needs. All component elements are aluminum alloy materials, which are assembled by mutual engagement. Therefore, the assembly outdoor balcony can be assembled, disassembled and adjusted quickly based on the on-site environment.

7 Claims, 8 Drawing Sheets



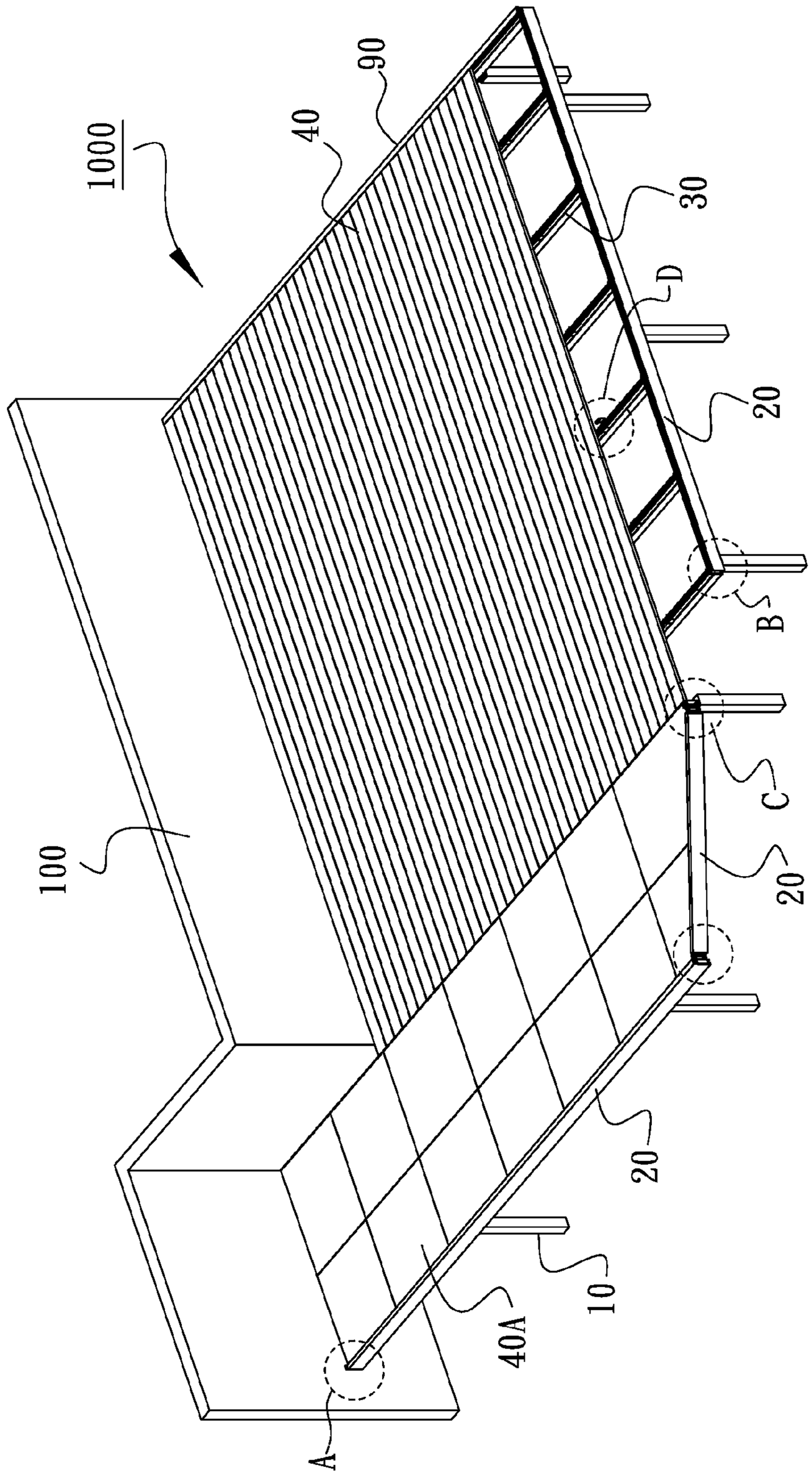


Fig. 1

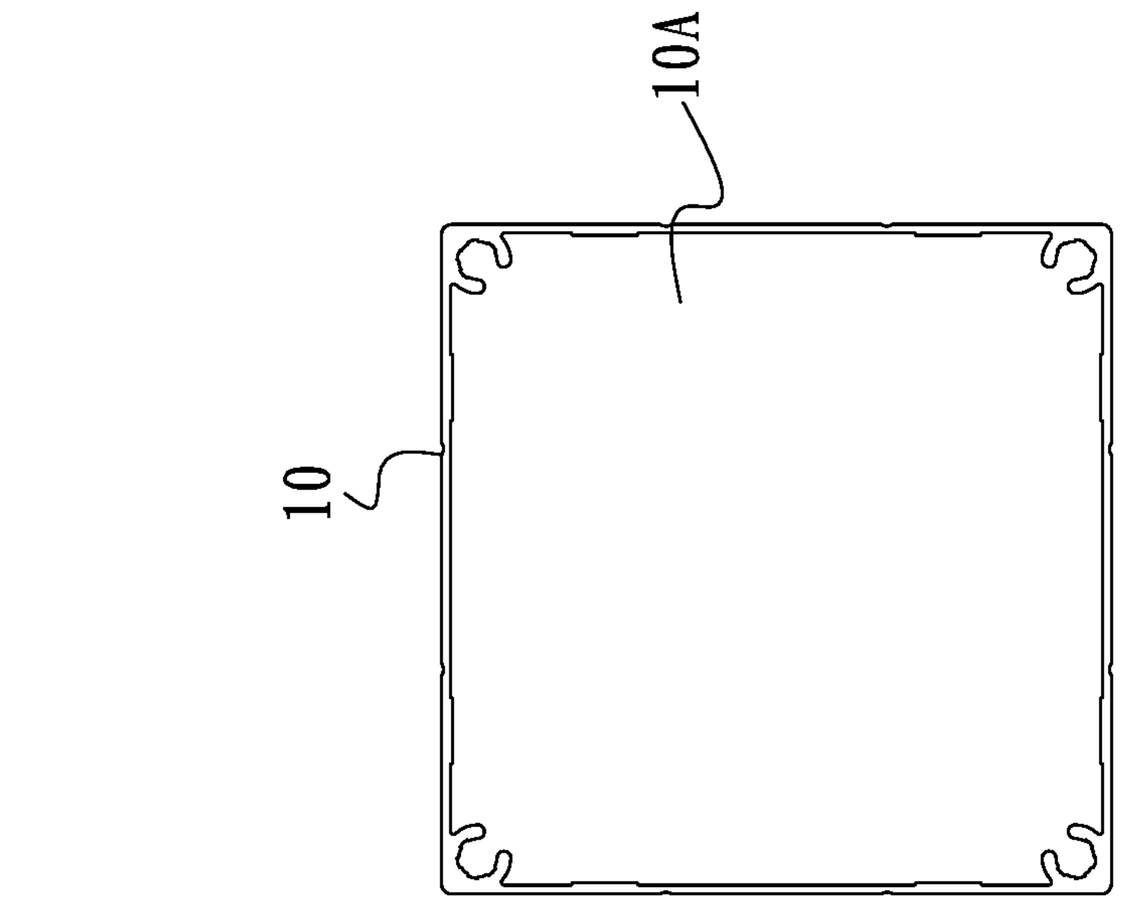


Fig. 3

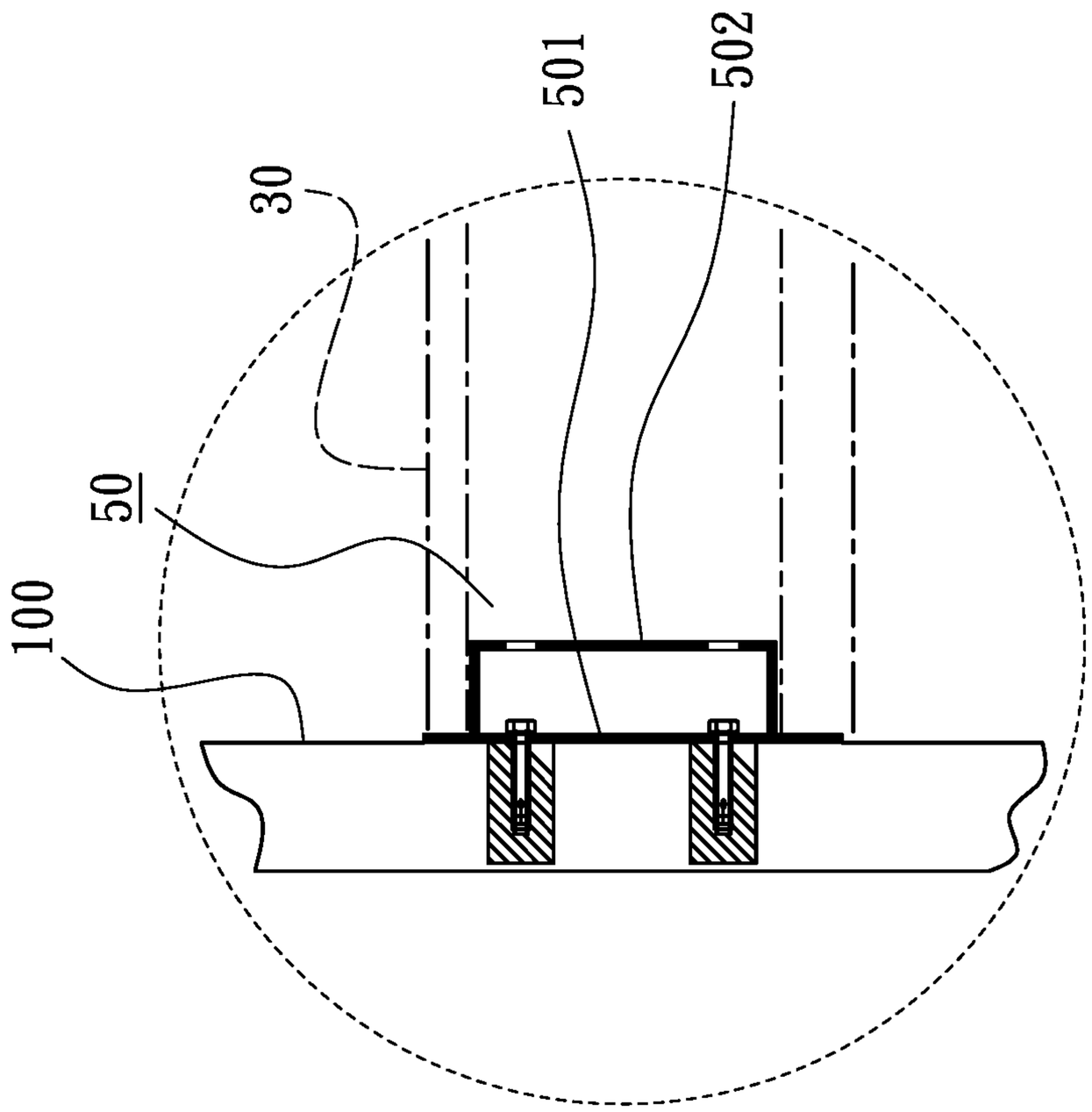


Fig. 2

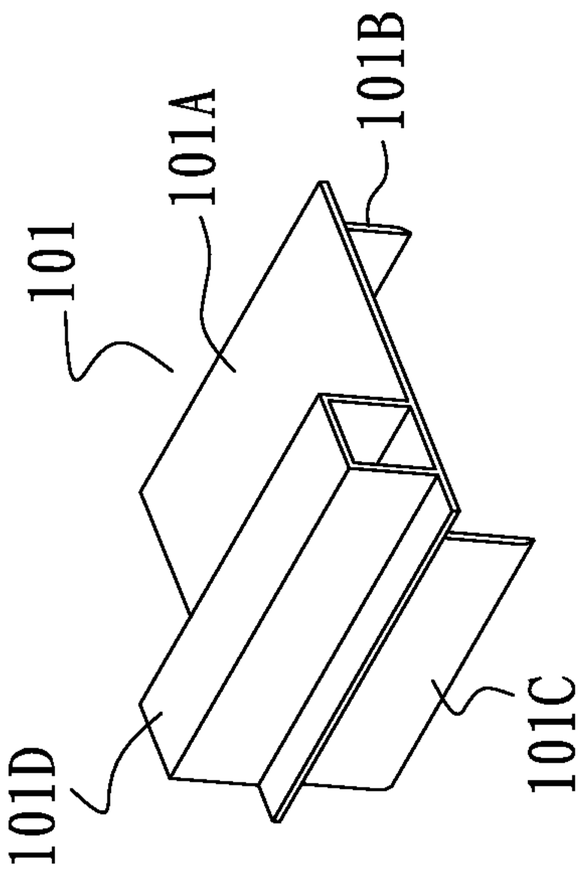

101
101A
101B
101C
101D

Fig. 5

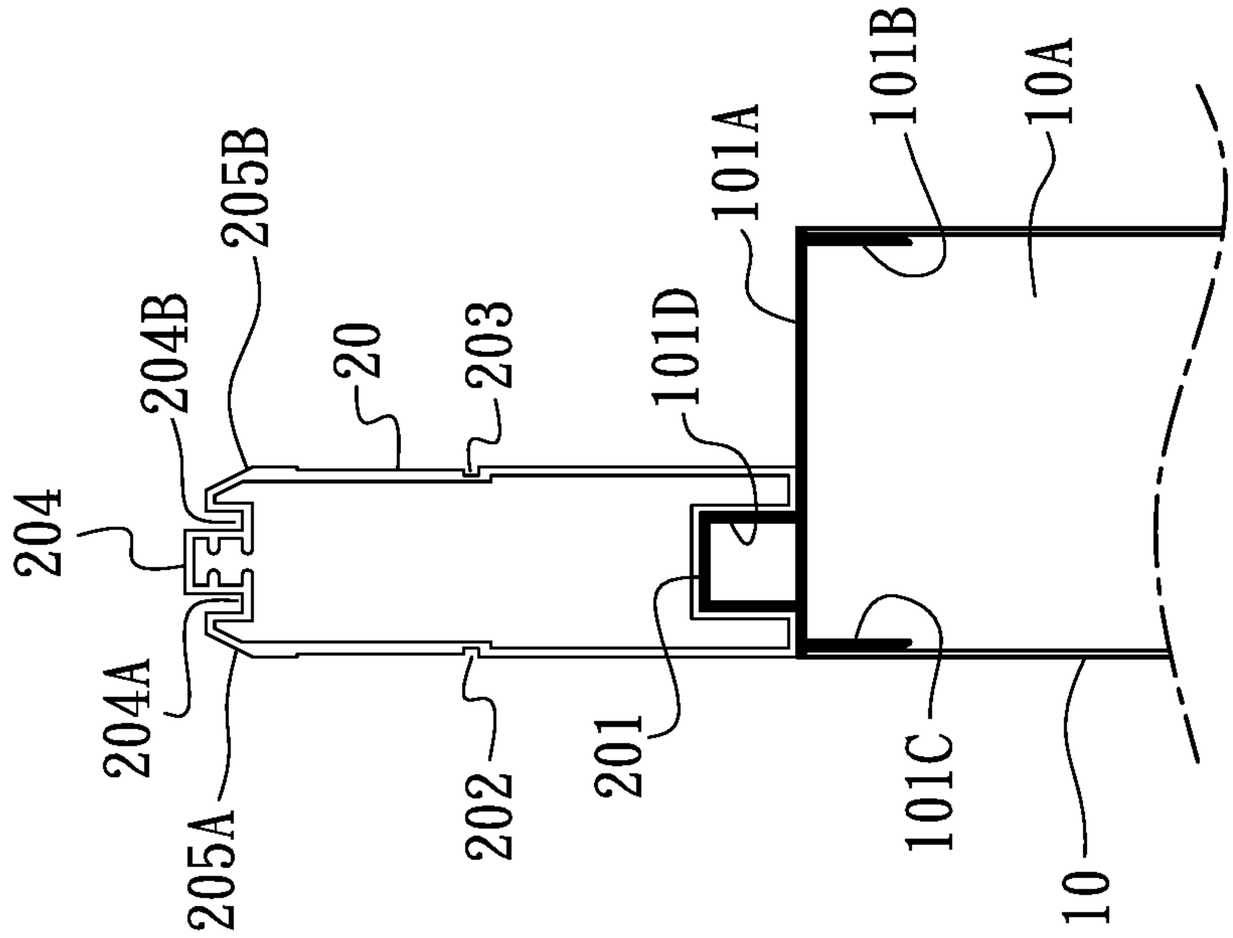

204
204B
205B
20
203
101D
101B
10A
204A
205A
202
201
101C
10

Fig. 4

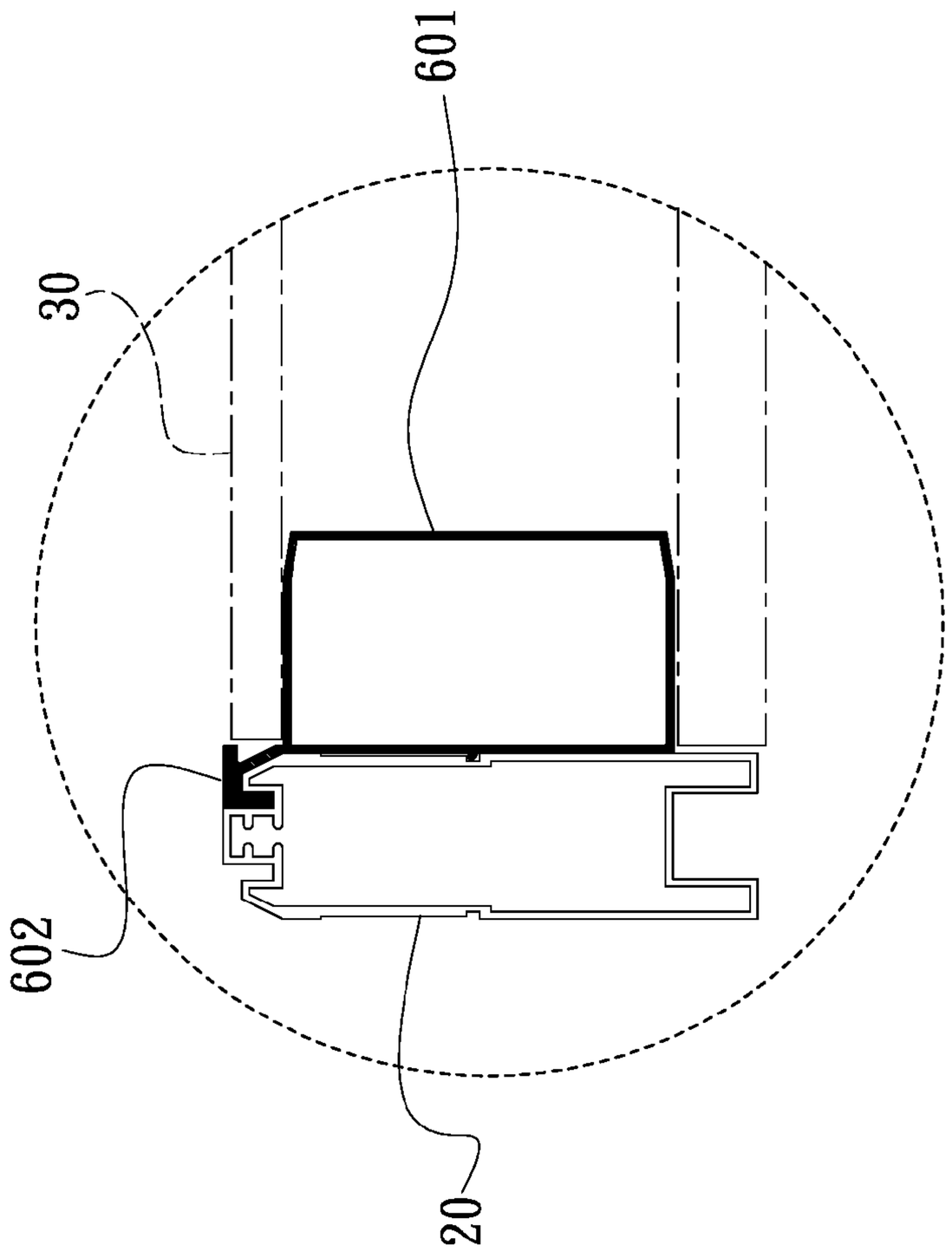


Fig. 7

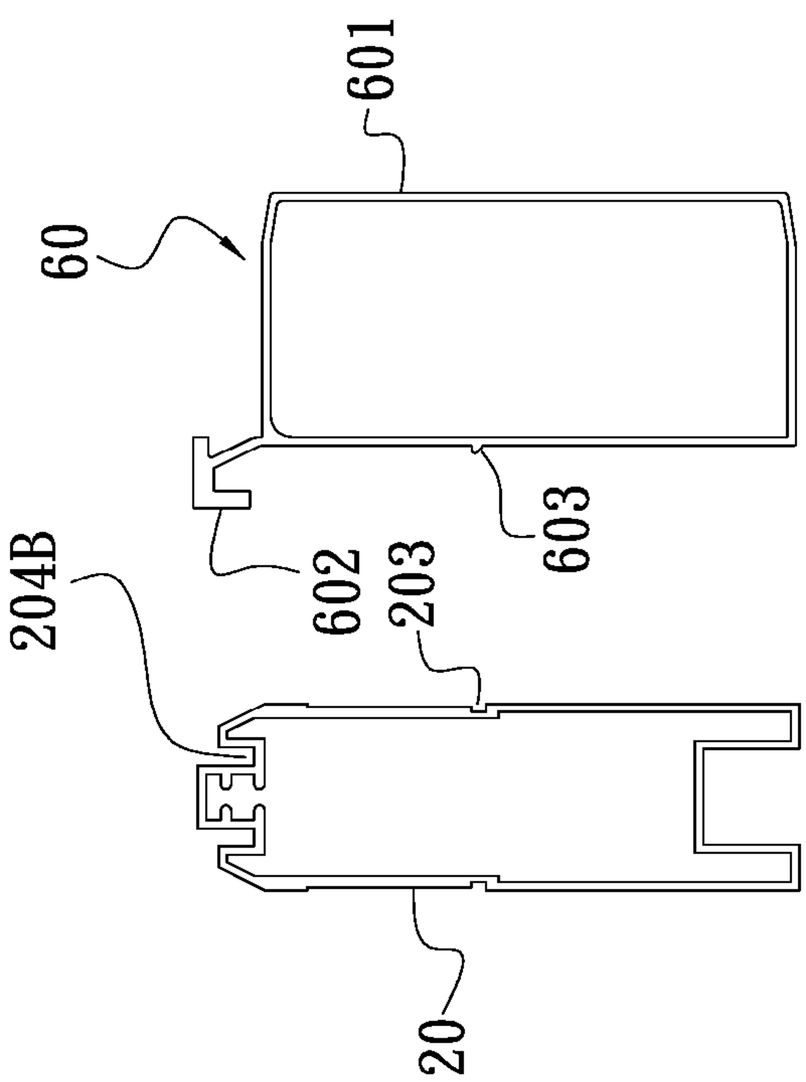


Fig. 6

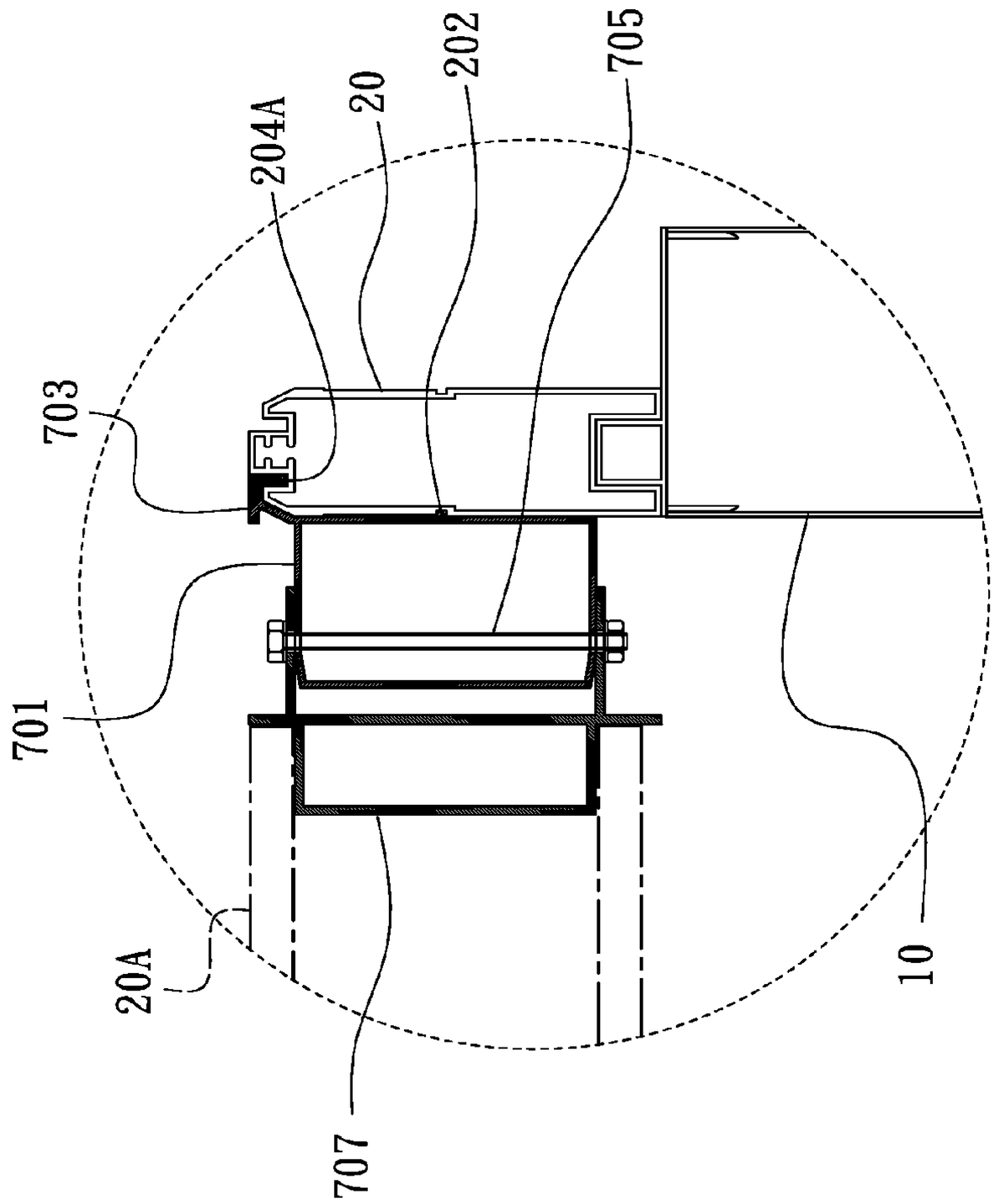


Fig. 9

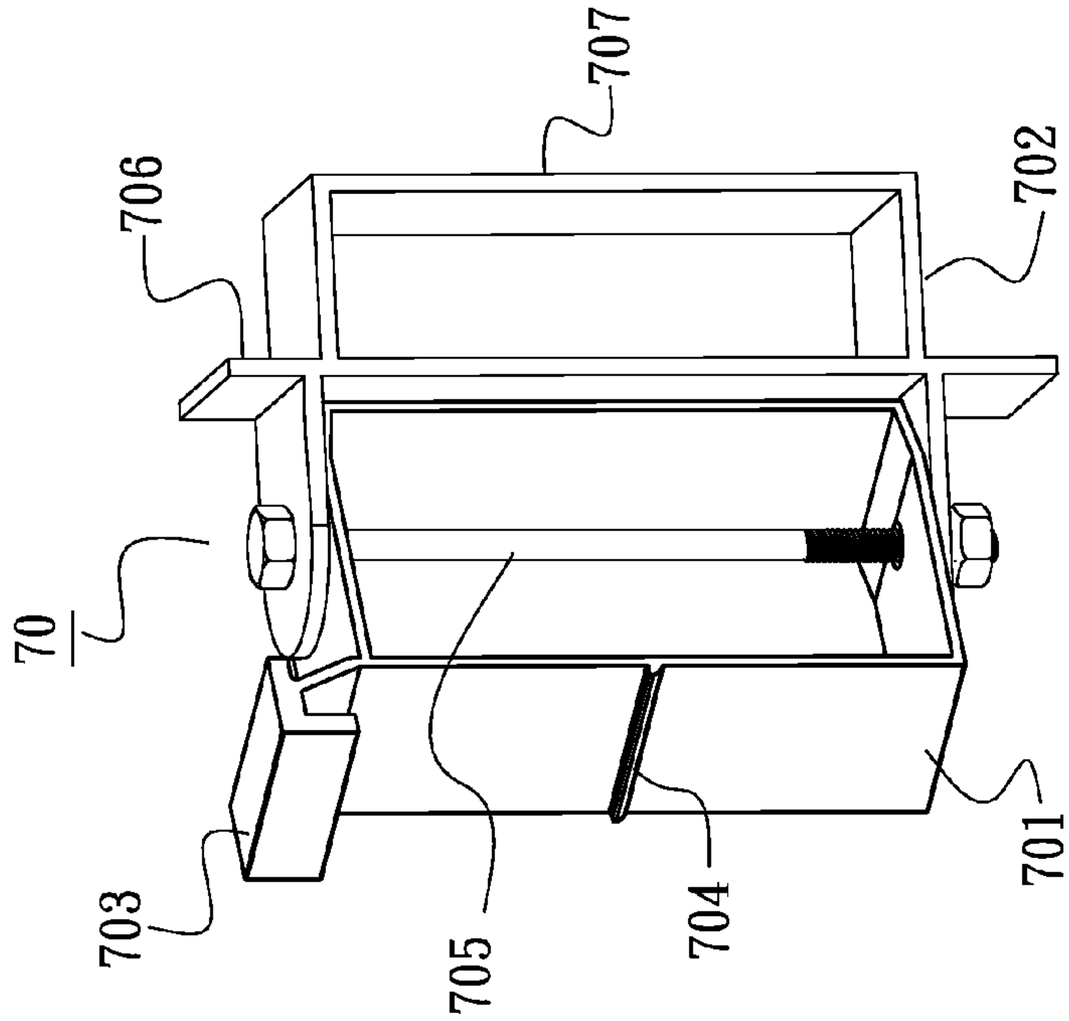
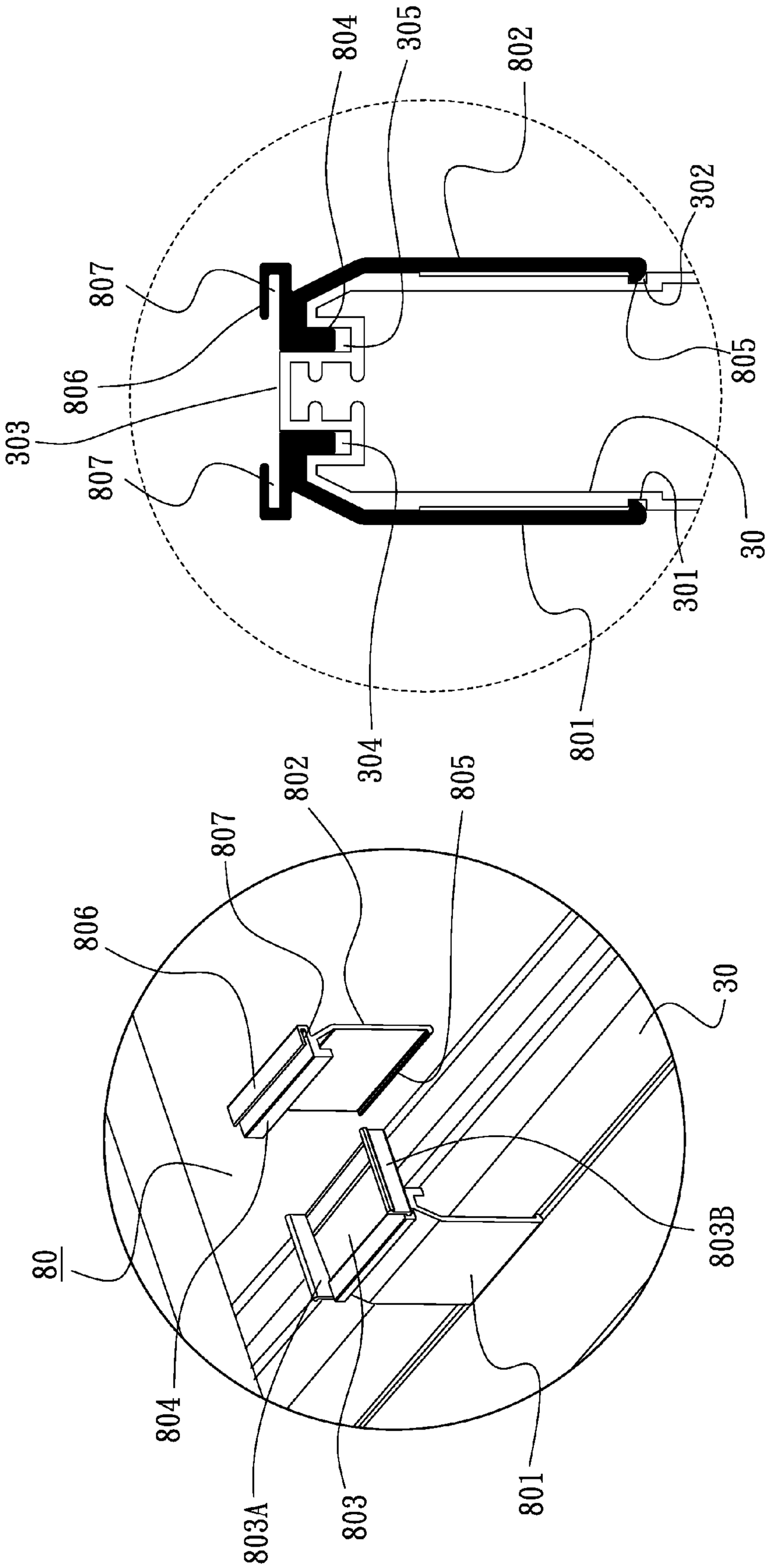


Fig. 8


804
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802
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807
806
303
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30
80
804
803A
803
801
803B

Fig. 11

Fig. 10

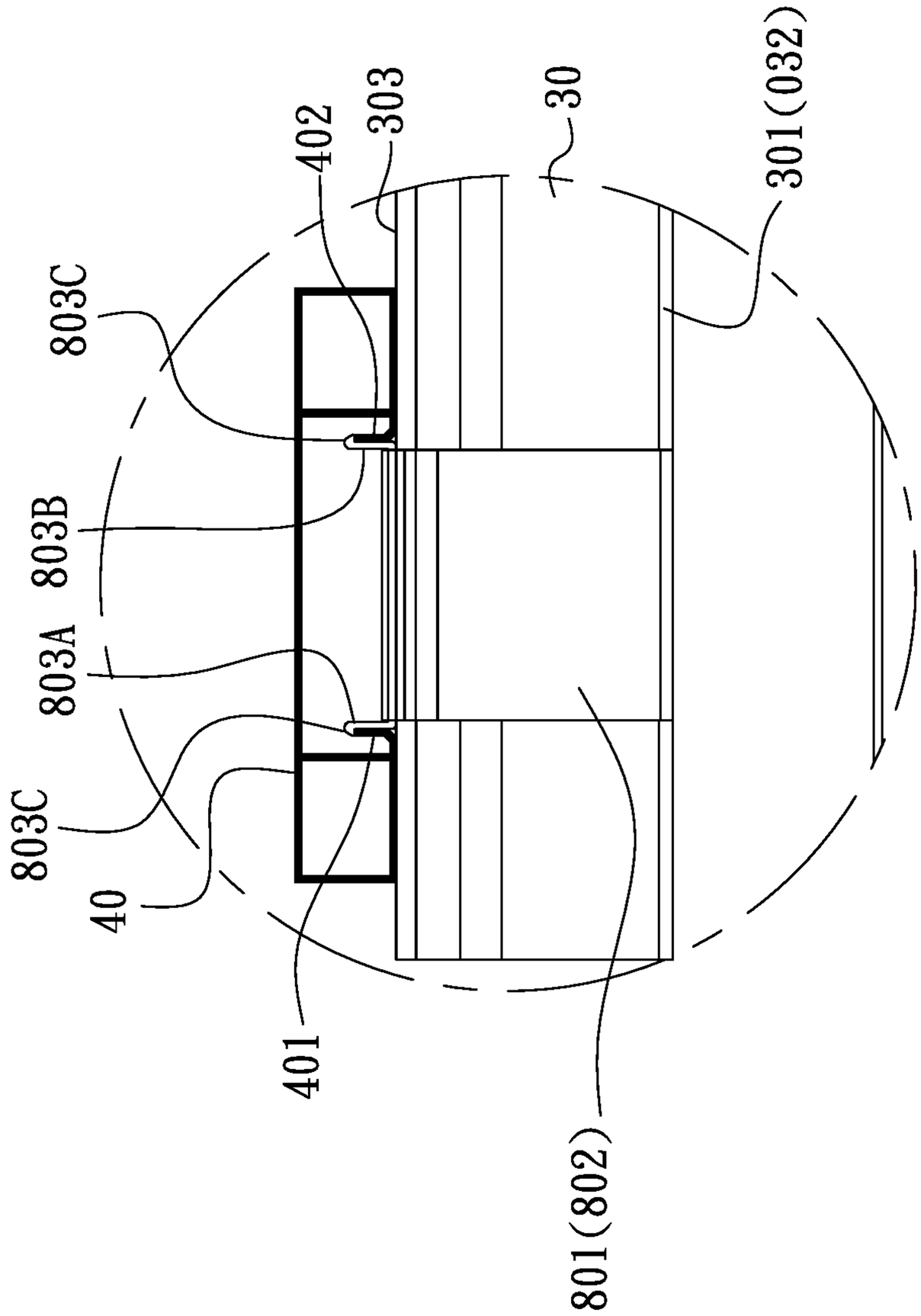

Fig. 12

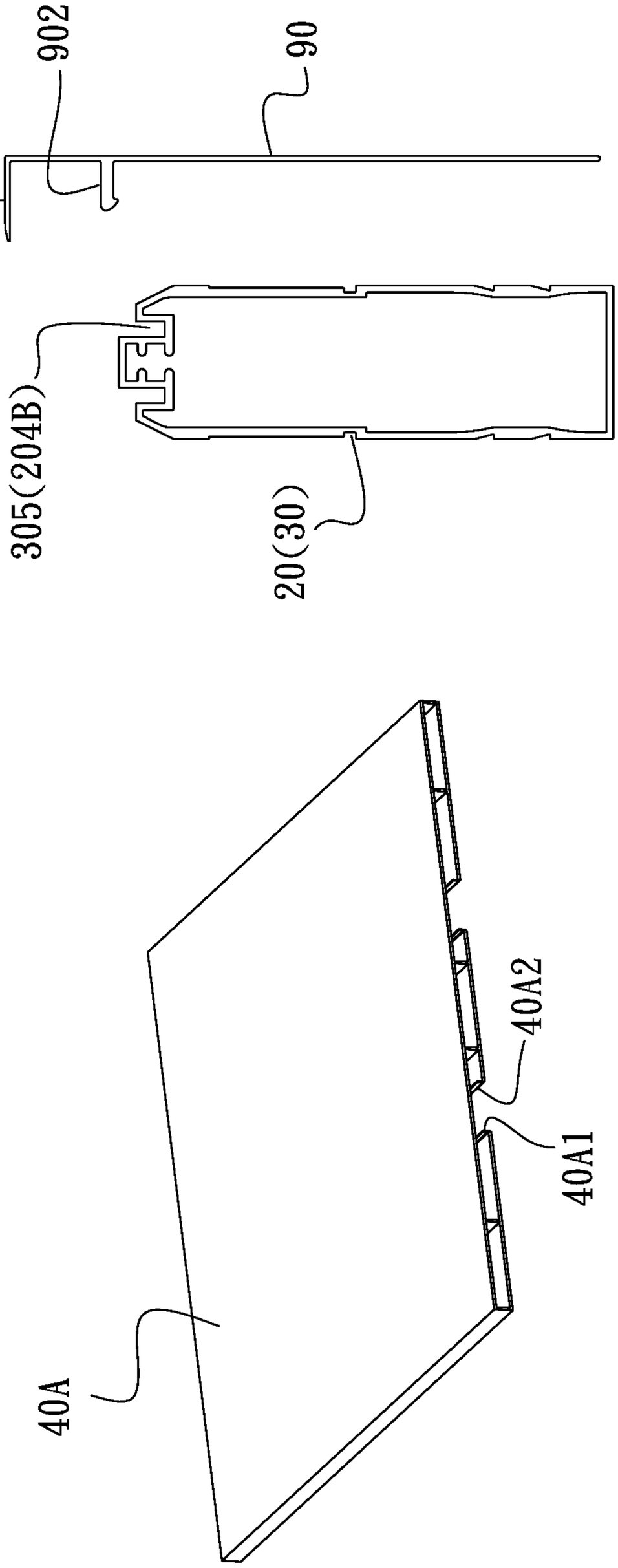

Fig. 13

Fig. 14

ASSEMBLY OUTDOOR BALCONY

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a balcony, particularly to an assembly outdoor balcony which can be quickly assembled and disassembled in accordance with the on-site environment.

2. Description of the Related Art

Currently, an outdoor balcony is usually made up of reinforced concrete, timber or welded steel structures. In general, after the columns are provided, cross beams are disposed at intervals, and then balcony panels are installed. However, the traditional outdoor balcony cannot be altered after the assembly is completed. If a user is not satisfied with the structure or type of assembly, the user can only disassemble the balcony and reassemble it. Besides, the user cannot temporarily change the type of assembly in accordance with the on-site environment or user's needs.

SUMMARY OF THE INVENTION

In view of the foregoing shortcomings related to the traditional fixed outdoor balcony in the prior art, the inventor studied a variety of methods based on manufacturing experiences and skills accumulated, and finally designed and developed the present invention after continuous research, experiments and improvement to eliminate deficiencies and defects in the prior art.

Accordingly, it is an objective of the present invention to provide an assembly outdoor balcony which is formed through aluminum extrusion molding, such that no screw is required for locking during assembly. Thus, it can be assembled and disassembled easily.

It is another objective of the present invention to provide an assembly outdoor balcony, which is formed by mutual engagement of a plurality of columns, cross beams, beams, adjustable hanging element wall-assembled hanging element, and balcony panels. Therefore, the assembly outdoor balcony can be assembled and disassembled quickly.

It is a further objective of the present invention to provide an upright outdoor balcony, in which component elements such as columns, beams, and cross beams can be assembled quickly through a wall assembled element and a beam hanger, and any of two beams can be assembled through an angle adjustable hanging element such that the peripheral shape of the balcony can be adjusted for changes in a variety of angles.

The detailed structure, application principles, functions and effectiveness of the present invention will be apparent with reference to the following description in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** is an assembled perspective view of the present invention;

FIG. **2** is a schematic drawing showing the assembly of cross beams and wall-assembled hanging elements in the present invention;

FIG. **3** is a plan view of columns in the present invention;

FIG. **4** is a plan view showing the assembly of the columns, beam hanger, and beams in the present invention;

FIG. **5** is a perspective view of the beam hanger in the present invention;

FIG. **6** is a plan view of the beams and engaged hanging element in the present invention;

FIG. **7** is a schematic drawing showing the assembly of the beams, engaged hanging element and cross beams in the present invention;

FIG. **8** is a perspective view of an adjustable hanging element in the present invention;

FIG. **9** is a schematic drawing showing the engagement of the beams and the adjustable hanging element in the present invention;

FIG. **10** is an exploded perspective view showing balcony panel assembly element assembled to the cross beams according to the present invention;

FIG. **11** is a sectional view showing the gusset plates of the balcony panel assembly element assembled to the cross beams according to the present invention;

FIG. **12** is a plan view showing the balcony panels assembled to the cross beams according to the present invention;

FIG. **13** is a perspective view of translucent balcony panels in the present invention; and

FIG. **14** is a schematic drawing before the sealing plate assembled to the cross beams according to the present invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

In the assembly outdoor balcony of the present invention, as shown in FIG. **1**, the outdoor balcony **1000** is formed by assembly of a plurality of columns **10**, beams **20**, cross beams **30**, and balcony panels **40** through aluminum extrusion molding, in which:

The plurality of columns **10** is disposed at intervals on one side of the wall surface **100** to form the whole periphery of the balcony.

The plurality of beams **20** is disposed on the columns **10** to form the whole periphery of the balcony.

The plurality of cross beams **30** are perpendicular to the wall surface **100**, and are horizontally disposed at intervals between the beams **20** and the wall surface **100**.

The plurality of balcony panels **40** are laid on the cross beams **30**. The balcony panels **40** may selectively be translucent balcony panels **40**A based on user's needs.

The detailed structure of the assembly outdoor balcony in the present invention will become apparent with reference to the embodiments in conjunction with accompanying drawings.

Please refer to section A of FIG. **1** and FIG. **2**. As shown, each of the cross beams **30** is a hollow body. An end of the cross beam **30** is hung on the wall surface **100** through a wall-assembled hanging element **50**.

The wall-assembled hanging element **50** includes a bottom plate **501** and a rim **502**. The bottom plate **501** is fixed to the wall surface **100** through a tool such as a nail. The rim **502** allows an end of the cross beams **30** to sleeve in and stop.

Please also refer to FIGS. **3** and **4**. As shown, the columns **10**, the beams **20**, and the cross beams **30** are all hollow frame bodies processed through aluminum extrusion molding. The columns **10** are hollow square frame bodies, and the beams **20** are vertical hollow frame bodies. A groove **201** is disposed at the lower end of the beams **20**, grooves **202** and **203** are disposed on both sides of the beams **20** respectively, and an upwardly protruding portion **204** is disposed at the

upper end of the beams **20**. Bottom grooves **204**A and **204**B are formed at the bottom of both sides of the protruding portion **204** respectively. The outside of the bottom groove **204**A, **204**B is an outer edge portion **205**A, **205**B with an oblique side having a height lower than the protruding portion **204**.

Please also refer to FIG. **5**. A beam hanger **101** is disposed above the columns **10** between the beams **20**. A bottom plate **101**A is disposed on the beam hanger **101**. Two upright insert plates **101**B and **101**C are disposed under the bottom plate **101**A. An upwardly protruding seat frame **101**D is disposed on one side of the bottom plate **101**A. When the insert plate **101**B and **101**C of the beam hanger **101** are inserted into a hollow section **10**A of the column **10**, the bottom plate **101**A is attached against the upper end surface of the column **10**. The groove **201** of the beam **20** is embedded into the upwardly protruding seat frame **101**D, such that the beam **20** can be quickly fixed onto the column **10**.

Please also refer to section B of FIG. **1** and FIGS. **6** and **7**. As shown, the beam **20** is assembled to the cross beam **30** through an engaged hanging element **60**. A frame body **601** and an upside down portion **602** are disposed in the engaged hanging element **60**. The frame body **601** is formed as a hollow aluminum extrusion body. The upside down portion **602** is obliquely and extendedly formed in a corner of the frame body **601**. An inverted L-shaped member is formed at an end of the upside down portion **602**. Through the upside down portion **602**, the engaged hanging element **60** can be inserted into a bottom groove **204**B on the beam **20**. A protruding rod **603** is disp°Ced up in the bottom groove **204**B of the beam **20**, the protruding rod **603** is just embedded into the groove **203** of the beam **20**, such that the engaged hanging element **60** can be securely hooked up on the side of the beam **20**. When the engaged hanging element **60** is hooked up on the beam **20**, the frame body **601** allows an end of the cross beam **30** to sleeve in and stop.

Please also refer to section C of FIG. **1** and FIGS. **8** and **9**. For the assembly outdoor balcony in the present invention, in response to different environments or user's needs, the balcony enclosed frame may be square or polygonal. As shown, an adjustable hanging element **70** is disposed at the junction of the two beams **20** such that the joint angle of the two beams **20** can be adjusted for a variety of changes. The adjustable hanging element **70** includes a fixed portion **701** and a rotating portion **702**; an obliquely extended upside down portion **703** is disposed at the upper end corner of the fixed portion **701**. An inverted L-shaped member is formed at an end of the upside down portion **703**, such that it can be inserted into a bottom groove **204**A of the beams **20**. A protruding rod **704** is disposed on one side of the adjustable hanging element **70**. When the upside down portion **703** is hooked up in the bottom groove **204**A of the beam **20**, the protruding rod **704** can be embedded into the groove **202** of the beam **20**, such that the adjustable hanging element **70** can be securely hooked up on the beam **20**.

As shown, the fixed portion **701** of the adjustable hanging element **70** is pivoted to the rotating portion **702** through a pivot **705**. The rotating portion **702** can rotate left and right relative to the pivot **705**; a partition plate **706** is disposed on one side of the rotating portion **702**, and an assembled frame **707** is disposed on the opposite side of the partition plate **706**. When the fixed portion **701** of the adjustable hanging element **70** is hooked up on a beam **20**, an end of another beam **20**A can be sleeved into the assembled frame **707**. Thus, the angles between the two beams **20** can be adjusted to different angles.

Please also refer to section D of FIG. **1** and FIGS. **10**, **11**, and **12**. As shown, a plurality of balcony panel assembly elements **80** are disposed on the cross beams **30**. The cross beams **30** and the beams **20** look the same. That is, a groove **301**, **302** is disposed on both sides of the cross beams **30** as well as both sides of the beams **20**. An upwardly projecting protruding portion **303** is disposed at the upper end of the cross beams **30** and the beams **20**. A bottom groove **304**, **305** is formed at the bottom of both sides of the protruding portion **303** respectively.

The balcony panel assembly element **80** includes two gusset plates **801** and **802** and a base plate **803**. The two gusset plates **801** and **802** are identical to each other. An upside down portion **804** is disposed at the upper end of the two gusset plates **801** and **802**, and a bottom hook **805** is disposed at the bottom of the two gusset plates **801** and **802**. A bent-back folded plate **806** is formed at an end of the upside down portion **803**, and a slot **807** is formed inside the folded plate **806**. Thereby, the upside down portion **804** of the gusset plates **801** and **802** can be hooked up in the bottom groove **304**, **305** of the cross beam **30**, and the bottom hook **805** can be hooked up in the groove **301**, **302** of the cross beam **30**, such that the two gusset plates **801** and **802** can be securely fixed to both sides of the cross beam **30**.

The length of the base plate **803** is the same as the width of the gusset plates **801** and **802**. As such, when the base plate **803** is inserted into a slot **807** of the two gusset plates **801** and **802**, the base plate **803** is clamped fixedly by the gusset plates **801** and **802**. This prevents the base plate **803** from sliding back and forth. Vertical plates **803**A and **803**B are formed at two ends of the base plate **803** respectively. The vertical plates **803**A and **803**B are perpendicular to the folded plate **806**. The height of the vertical plates **803**A and **803**B is slightly greater than the folded plate **806**. Also, an inverted bent portion **803**C is formed at top end of the base plate **803**;

As shown, two guide plates **401** and **402** which are extending from bottom to top are disposed at the lower end of the balcony panels **40**. When the two guide plates **401** and **402** are inserted into the outside of the vertical plates **803**A and **803**B of the base plate **803**, the two guide plates **401** and **402** can be vertically clamped fixedly by the inverted bent portion **803**C of the vertical plates **803**A and **803**B and the protruding portion **303** of the cross beam **30**, by which the balcony panels **40** can be tightly fixed to the top of the cross beam **30**. Moreover, the position of the base plate **803** is limited by the gusset plates **801** and **802**, the sliding and displacement of the balcony panels **40** can be avoided.

As shown in FIG. **13**, similarly, two guide plates **40**A**1** and **40**A**2** are formed at the lower end of the translucent balcony panel **40**A and balcony panels **40**. When the two guide plates **40**A**1** and **40**A**2** are inserted into the outside of the vertical plates **803**A and **803**B of the base plate **803**, the two guide plates **40**A**1** and **40**A**2** can be vertically clamped fixedly by the inverted bent portion **803**C of the vertical plates **803**A and **803**B and the protruding portion **303** of the cross beams **30**.

As shown in FIG. **14**, when the assembly of the balcony panels **40** is complete, a sealing plate **90** is assembled to the outside of the cross beams **30** or the beams **20** (please also refer to FIG. **1**). An upper lateral gusset plate **901** and a lower lateral gusset plate **902** are disposed at intervals at the upper end of the sealing plate **90**. The lateral gusset plate **902** is buckled into the bottom groove **305** of the cross beam **30** or the bottom groove **204**B of the beam **20**, and then the

upper lateral gusset plate **901** is pressed against the balcony panel **40**, whereby the completely assembled outdoor balcony maintains aesthetics.

Accordingly, the assembly outdoor balcony in the present invention can be assembled and disassembled quickly because the overall elements are assembled through mutual engagement. Through the bottom groove disposed on the beams and the cross beams, the adjustable hanging element **70** and the engaged hanging element **60** can be positioned and fixed quickly; the balcony panels assembly element **80** can also be easily mounted on the cross beams. Also, once the installation position of the balcony panels are confirmed, the balcony panel assembly element **80** can be positioned and fixed quickly, which prevents the balcony panels from sliding due to strong winds after the assembly.

When the present invention is implemented, the length of the balcony panels may selectively be lightweight aluminum panels with the length of 6 feet and the width of 1 foot. The translucent balcony panels may selectively be glass fiber with the length of 3 feet, and the width of 3 feet. Also, since the assembly elements are all made of lightweight aluminum alloy, they are easy to process, compact and easy to install, thereby improving their productivity while reducing the user's installation time.

When the present invention is implemented, the balcony panels and the translucent balcony panels may selectively be made of fiberglass materials with good insulation, heat resistance, anti-corrosion effect, and high mechanical strength.

It should be noted that the described are preferred embodiments, and that changes and modifications may be made to the described embodiments without departing from the scope of the invention as disposed by the appended claims.

What is claimed is:

1. An assembly outdoor balcony, which is made up of a plurality of columns, beams, cross beams, and balcony panels, wherein:

the plurality of columns are disposed at intervals on one side of a wall surface to form the whole periphery of the balcony;

the plurality of beams are disposed above the columns to form the whole periphery of the balcony;

the plurality of cross beams are disposed at intervals between the beams and the wall surface;

the plurality of balcony panels are disposed above the plurality of cross beams;

which is characterized in:

each of the plurality of cross beams is a hollow body having one end hanged to the wall surface through a wall-assembled hanging element and the opposite end jointed to the beam through an engaged hanging element; wherein,

the wall-assembled hanging element comprises a bottom plate and a rim, the bottom plate is fixed to the wall surface, and the rim allows an end of each of the plurality of cross beams to sleeve in and stop;

a protruding portion is disposed at the upper end of the beams, and a bottom groove is formed on both sides of the protruding portion respectively;

the engaged hanging element is disposed with a frame body and an upside down portion, the frame body is a hollow body, the upside down portion is formed extendedly and obliquely in the corner end of the frame body, and an end of the upside down portion is formed with an inverted L-shaped member, such that the upside down portion is able to be inserted into a bottom groove on the beams;

when the engaged hanging element is hooked up on the beam, the frame body allows an end of each of the plurality of cross beams to sleeve in and stop;

thereby the plurality of cross beams are easily fixed between the wall surface and the beams through the wall-assembled hanging element and the engaged hanging element.

2. The assembly outdoor balcony as claimed in claim **1**, wherein a beam hanger is disposed on the columns, a bottom plate is disposed on the beam hanger, two insert plates are disposed at intervals under the bottom plate, the insert plates are inserted into an interior of each of the plurality of columns, such that the bottom plate is attached against the top of each of the plurality of columns; an upwardly protruding seat frame is disposed on the bottom plate; a groove is disposed at the lower end of each of the plurality of beams, and the groove is embedded into the seat frame of the beam hanger, such that the plurality of beams are fixed securely onto the columns.

3. The assembly outdoor balcony as claimed in claim **1**, wherein a groove is disposed on both sides of each of the plurality of beams respectively, and a protruding rod is disposed on one side of the frame body of the engaged hanging element relative to the groove of the respective beam; thereby, when the upside down portion of the engaged hanging element is hooked up in the bottom groove of the respective beam, the protruding rod is embedded into the groove of the respective beam at the same time, such that the engaged hanging element is securely fixed to the side of the respective beam.

4. The assembly outdoor balcony as claimed in claim **1**, wherein an adjustable hanging element is disposed at a joint of two beams of the plurality of beams, the adjustable hanging element comprising a fixed portion and a rotating portion; an obliquely extended upside down portion is disposed at the upper end corner of the fixed portion, which is able to be inserted into the bottom groove of one of the plurality of beams through the upside down portion, a protruding rod is disposed on one side of the adjustable hanging element; when the upside down portion is inserted into the bottom groove on the one of the plurality of beams, the protruding rod is embedded into the groove of the one of the plurality of beams, such that the fixed portion of the adjustable hanging element is able to be securely fixed to the side of the one of the plurality of beams; the fixed portion is pivoted to the rotating portion through a pivot, such that the rotating portion is able to rotate relative to the pivot; the rotating portion is disposed with an assembled frame, which allows another beam to sleeve in from one end thereof, such that the joint angles of the two beams jointed by the adjustable hanging element is able to be arbitrarily adjusted.

5. The assembly outdoor balcony as claimed in claim **1**, wherein the cross beams and the beams have the same structure, in which a groove is disposed on both sides of the cross beams and the beams respectively, an upwardly protruding portion is disposed at their upper end, and a bottom groove is formed at the bottom of both sides of the protruding portion respectively.

6. The assembly outdoor balcony as claimed in claim **5**, wherein the plurality of balcony panel assembly elements are disposed on the plurality of cross beams such that the balcony panels are able to be inserted therein fixedly; wherein,

the balcony panel assembly element comprising two gusset plates and a base plate, the two gusset plates are identical to each other, wherein an upside down portion is disposed at the upper end of the two gusset plates, a bottom hook is disposed at the bottom of the two gusset plates, the upside down portion is hooked up in the bottom groove of one of the plurality of cross beams, while the bottom hook is hooked up in the groove of the one of the plurality of cross beams; a bent-back folded plate is formed at an end of the upside down portion of the gusset plate, and a slot is formed inside the folded plate;

the base plate is disposed between two gusset plates, and is clamped by the slot between the two gusset plates, a vertical plate is formed at both ends of the base plate respectively, the vertical plates are perpendicular to the folded plate, an inverted bent portion is formed at the top edge of the vertical plates;

two guide plates which extend from bottom to top are disposed at the lower end of the balcony panels, by which the balcony panels are able to be inserted to the outside of the vertical plates of the base plate, and then through the inverted bent portion of the vertical plates and the protruding portion of one of the plurality of cross beams, the guide plates are vertically clamped securely, such that the balcony panels are able to be securely fixed onto the cross beams.

7. The assembly outdoor balcony as claimed in claim **6**, wherein a sealing plate is disposed at the outside of the cross beams or beams, an upper lateral gusset plate and a lower lateral gusset plate are disposed at intervals at the upper end of the sealing plate; the lower lateral gusset plate is buckled into the cross beams or the bottom groove of the beams, and then the upper lateral gusset plate is pressed against the balcony panels, whereby the completely assembled outdoor balcony maintains aesthetics.

* * * * *